now that we have all come to recognize species as nothing more than pronounced varieties, it appears to me a curiously interesting example of the "survival" of traditional modes of thought, that so many systematists still continue to regard the value of Mr. Darwin's theory to consist in what is really its least important function. The result has been clearly displayed in the present correspondence:—

> There's such divinity doth hedge a species.
> That science can but peep to what it would.

London, December 8. GEORGE J. ROMANES.

Engineers *versus* "Professors and College Men."

PROF. TAIT in his recent letter says that the only meaning the expression $\frac{Mv^2}{2g}$ conveys to his mind is the product of a mass by a length. But how does he measure his mass and his length? Is the mass to be measured in pounds or kilogrammes, or to be measured in units of g pounds or g kilogrammes? And is the unit of length the foot, or the metre or centimetre? so that g is variously 32, 9·81, or 981.

These are the points which are slurred over by "Professors and College men," but are of fundamental importance to practical engineers, who dare not trust to a formula till they have verified it numerically.

Let me conclude by giving Prof. Tait a question, selected from College text-books:—

"What is the meaning of $\frac{Mv^2}{2g}$ when the unit of area is one-tenth of an acre, the numerical value of g is 2, and the unit of weight is the weight of unit volume of the standard substance (the substance of which the specific gravity is unity)?"

I think he would be amused by the variety of answers he would receive, although the answers might individually be all correct.

December 17. A. G. GREENHILL.

Mr. Dodgson on Parallels.

MR. DODGSON has written to me thanking me heartily for my "interesting and helpful review" of his "New Theory of Parallels." He admits his slip in the corollary on p. 11, and supposes, as I had myself thought, he took ADC to be the triangle required instead of ABF. "But there is *one* criticism of yours which, if true, would vitiate the whole treatise. May I ask you to reconsider the point, and, should you see reason so to do, to notify to the readers of NATURE that you withdraw it? You say that, in Props. viii., xi., I tacitly assume that the 'amounts' of triangles are either *all* greater than two right angles, or else *all* less. . . . Such an assumption would indeed be monstrous." I willingly accede to Mr. Dodgson's request, as the following form of his argument, supplied in his letter to me, does away with my difficulty. "Either (α) there is a triangle whose 'amount' = two right angles, or (β) there is none. If (β) be true, then either ($\beta 1$) *all* triangles have *greater* 'amounts,' or ($\beta 2$) *all* have *less* amounts, or ($\beta 3$) some have *greater* amounts and all others *less*. Now ($\beta 1$) is proved impossible, in Prop. viii.; ($\beta 2$) is proved impossible in Prop. xi.; ($\beta 3$) may easily be proved impossible, by means of Prop. vii. Hence (β) is impossible. Hence (α) is true." It will be well, if, in a future edition, the missing link of ($\beta 3$) be supplied. One other point puzzles Mr. Dodgson. It is my remark on Prop. vi.: "How are the figures to be constructed if $n>2$?" Mr. Dodgson says: "It surely does not need pointing out that the operation of bisecting an angle may be repeated *ad libitum.*" Certainly not. But what I meant was the effect of these bisections upon the resultant chords. The figures to the proposition are incorrectly drawn: in the one figure BD, DC, and in the other BE, ED, DF, FC are *not drawn* greater than the radius, and my point was not the bisections but the enlargement of the figure: thus if $n = 3$, we should have eight triangles, vertices at the centre A, with the sum of their angles greater than 480°. My apology for thus trespassing upon valuable space is my desire to meet Mr. Dodgson's natural wish, and by pointing out what I thought were faults in his "interesting" *brochure* to enable him to make it more perfect in after editions. R. TUCKER.

University College School.

The *Porcupine* Echinoidea.

THE researches lately published by the Drs. Sarasin upon the anatomy of the Echinothuridæ, render a careful reconsideration of the types of Asthenosoma collected by the late Sir Wyville Thomson, during the voyage of H.M.S *Porcupine*, absolutely necessary in my opinion. The species were described in the Philosophical Transactions for 1874. I shall be much obliged if information can be sent me regarding the whereabouts of the specimens which were figured by Wild, *i.e.* the type-specimens of *Calveria* (*Asthenosoma*) *hystrix*, Wy. Th.; *C.* (*Asthenosoma*) *fenestrata*, Wy. Th.; and *Phormosoma placenta*, Wy. Th.

P. MARTIN DUNCAN.

Angry Birds.

IN reference to the notice of a fierce pheasant mentioned by Mr. Maw in the number of NATURE for December 13, I would refer him to my "Observations in Natural History" (p. 172), in which I have spoken of a daring cock pheasant, which I saw myself, while walking in the grounds of a friend in Cambridgeshire. This bird was in the habit of attacking any persons that approached near the spot where he was. Some woodcutters at work on the grounds had to protect their legs with strong leather gaiters. L. BLOMEFIELD.

Bath, December 18.

TWO years ago, whilst walking across a fallow field here, I heard a fluttering of wings, and received a violent blow on the back of the neck from a partridge: before I could recover myself she struck the back of my head and knocked my hat off. Although I had a heavy stick, I could not drive off the bird, who made a loud noise, and now attacked me in front. As I walked rapidly off, the bird followed and struck at me many times, attacking my head and shoulders with the greatest determination and violence. W. G. SMITH.

Dunstable.

PRESENTATION OF A PORTRAIT OF PROFESSOR A. W. WILLIAMSON, F.R.S., TO UNIVERSITY COLLEGE.

ON Wednesday (the 12th inst.) a portrait of Prof. A.W. Williamson, late Professor of Chemistry to University College, London, was presented to the College by Sir Henry E. Roscoe, M.P., F.R.S., on behalf of the committee of subscribers. The portrait is painted in oil by the Hon. John Collier. The presentation took place in one of the lecture-rooms, the chair being taken by the President of the College (Mr. John Erichsen, F.R.S.); and amongst those present were Sir F. A. Abel, Prof. Bonney, Prof. H. Morley, Dr. J. H. Gladstone, Prof. George Carey Foster, Dr. Atkinson, Prof. Ramsay, Prof. Thorpe, Prof. Marks, Prof. Russell Reynolds, and other Professors, and a large number of the past and present students of the College.

Dr. W. J. Russell, on behalf of the Committee, for whom he had acted as Treasurer, said that judging from the subscription list there was a large number of the former colleagues of Prof. Williamson who had subscribed to this portrait; and it would no doubt be very pleasant to him to know that members of all the Chemical Societies in England had liberally subscribed towards the portrait; and further, that many of the subscribers had not satisfied themselves by sending formal contributions, but had written to him (Dr. Russell) expressing their great esteem and regard for Dr. Williamson. The subscriptions did not come only from various parts of Great Britain, but from France, Germany, Switzerland, Italy, Russia, and even so far afield as the United States, Jamaica, India, and Japan. He thought this was all that it was necessary for him to say in order to indicate the high value which the subscribers attached to the great scientific attainments and labours of Dr. Williamson, whose intimate friends and old pupils, those who knew him best, now came forward to pay him this mark of their esteem and regard.

Sir Henry Roscoe, M.P., said:—I consider it, sir, a privilege that, as an old pupil and an attached friend of Dr. Williamson, I should have been chosen, on this occasion, to present his portrait—which I think you will all consider as a life-like one—by Collier, to the College in which he laboured so faithfully and so successfully for nearly forty years. The first appointment of Dr. Williamson dates, as you, sir, are aware, from the year 1848, when, following Fownes, he was, as Professor of Practical Chemistry, placed in charge of the first teaching scientific laboratory established in England, and in a few years afterwards, on the resignation of Graham, he assumed the responsibilities of the two Chairs of Chemistry. A favourite pupil of Liebig's, Williamson had at Giessen imbibed the scientific spirit of that great master, and had, at the early age of nineteen, published his first original investigation. Afterwards carrying on his studies in Paris, and becoming intimate with Laurent and Gerhardt, he brought to London the best traditions of the French as well as of the German schools of chemistry, uniting in his person the attributes of both. Entering upon his duties in this College with the enthusiasm for his science characteristic of his nature, was it to be wondered at that he should have imparted to the young men who were fortunate enough to come under his influence some sparks of that fire which burnt so brightly in his own breast? I well remember the vivid interest, the keen appreciation, with which all those who studied in the Birkbeck Laboratory at that now distant time followed step by step the unfolding of his views on etherification, and on the constitution of salts, which may be truly said to have laid the foundations of modern organic chemistry. All those of his pupils who then made up their minds to devote their lives to chemistry, whether in the walks of the pure science or in those of its applications, must willingly own that much of the success which they may have met with in after years is due to his teaching and example; and admit that in the receptive period of a man's life the influence exerted upon them by a teacher whose years were not far removed from their own, of high aims and of ardent temperament, could not fail to be inspiring. This is not the occasion to inquire into the position which Williamson holds as one of the great chemists of our time and country. Rather is it our object now to express the feelings of gratitude and, if I may be allowed to say so, of affection, which we, who have been his pupils and are his friends, as well as those of us who can only claim the latter but perhaps no less intimate relationship, entertain towards him; to assure him that we look back upon the times spent in the laboratory with him as some of the pleasantest as well as some of the most fruitful of our lives. And both pupils and friends here join to show their appreciation of his labours and of his character, and to acknowledge the debt which they and their science owe to him. This portrait, sir, of our friend and master, finds a fitting resting-place within the walls of the College in which his working years were spent. It will remain as a memorial of a teacher, an investigator, and a colleague, whose main interest was to uphold and increase the renown of University College as a centre of intellectual progress, and of one whose character, both as a man and as a chemist, future generations, like our own, will delight to honour. It is now my pleasing duty to unveil the portrait, and to ask you, sir, as the President of this College, to accept it on behalf of the subscribers.

The portrait was then exposed to view.

The President said:—In the name of and on behalf of the Council and members of this College, I accept with gratitude this admirable likeness of our dear colleague and friend, Dr. Williamson. Sir Henry Roscoe has truly said that this is not the place to dilate on Dr. Williamson's great scientific merits, and the great claims which he has as a scientific man to any honour that could be bestowed upon him. I shall not venture on this subject, but I may say this: that looking at Dr. Williamson's career, as I can do, for the last forty years (thirty years of which he has been connected with this College), there never was a man more loyal to this institution, and more devoted to its best interests, than Dr. Williamson. The business of a Professor here is not only to teach, but to take part in the management of the College, which, as you know, devolves individually and collectively upon them. It is in the meetings of the Council and the Senate that the devotion of the Professors to the interests of the College is shown quite as much as in the teaching of classes. The College could not be worked without the business aptitude of the professorial staff; and in this duty of management none showed more zeal, loyalty, and devotion, during thirty years, than Dr. Williamson. We as a governing body must feel deeply indebted to him for the interest which he has shown in the welfare of this institution. But I should not be doing my duty if I were not to couple with his name that of his wife. Mrs. Williamson was as devoted as her husband, and did very much to raise the character of the School. She showed the greatest interest and enthusiasm in all the work which as a woman she was able to perform, and to bring about harmony within the walls of this institution. Mrs. Williamson worked side by side with her husband with unwearied devotion in, as I have already said, the best interests of University College. Ladies and gentlemen, I can only add in my own name, and in the name of this institution, the hope that Dr. Williamson and Mrs. Williamson will be followed with all health and happiness in their comparative retirement from further active work.

Sir Frederick Abel said:—Allow me to move a vote of thanks to the President of the College for his kindness in being the mouthpiece of many old friends in expressing as he has done the high respect and great affection entertained for Dr. Williamson by all his old colleagues. I desire to add that it is a great pleasure to me to be able to assist at this ceremony; and I, for one, am highly gratified at the life-like portrait presented to the College and accepted by you, sir, as President, on its behalf.

Dr. T. Anderson seconded the vote of thanks proposed by Sir Frederick Abel.

The President briefly acknowledged the compliment which had been paid him.

Dr. Williamson (who was received with cheers) said:—" I believe, sir, that the reward which upon the whole is most satisfactory (and which perhaps I may call the highest) which can be given to the man who has endeavoured to do his duty, is the expression of approbation from men of high authority on the subject-matter on which he has worked. The compliments which have been paid to me to-day have been enhanced greatly by some words which Sir Henry Roscoe let fall, and which could not have come with greater weight from anyone than from my old friend. It is to me a proud feeling—one which gives me great satisfaction—that in the decline of my life, and the end of my career, I should, from such a man—a man of such high character and position—have received so cordial and friendly an expression of approbation and personal esteem. I must ask leave, sir, to thank the Council, and you as their head, for the honour which you have done me in allowing my portrait to be placed within these walls; for although I have been associated with other colleagues, and have performed duties of other kinds, there is no place that I have felt it so great an honour to be connected with as University College. Here I have been associated with many men who have made noble self-sacrificing efforts in the best interests of this institution. I look back with pride on my connection with my colleagues of this College, though I have often bitterly regretted that my intercourse with the students has not been more personal. Sometimes a man comes up to me, shakes me by the hand, and calls me by my name, and I am obliged, to my shame, to confess that I do not know his name, which I am obliged to ask, and then I find he was an old student who knew me perfectly, remembered my lecturing in a long dark room, in which I was visible to him, though he was not visible to me. I have often very much regretted that I have not been brought into closer relations with this large body of earnest men and students. Still, among those whom I have known I have found many esteemed friends. I do not think it desirable for me to make further remarks, beyond expressing to Mr. Collier my appreciation of his success in making what is not an ugly portrait out of such an ugly face as mine.

The proceedings then terminated.

In the evening Dr. Williamson was entertained at dinner at the Freemasons' Tavern by a goodly number of his friends and old pupils. Sir Henry Roscoe presided. After the toast of the Queen had been given and duly honoured, Mr. Carteighe, one of the honorary secretaries, announced that a considerable number of letters from subscribers had been received, expressing their regret at not being able to be present. The one from Prof. Michael Foster, F.R.S., referred humorously to Dr. Williamson as the "Ether Meister."

Sir Henry Roscoe, in proposing the toast of the evening, "Our Guest" (Dr. Williamson), alluded in kindly and affectionate terms to his early association with him, to his enthusiasm as a teacher, and to the respect in which he was held by men of science all over the world.

Dr. Williamson, in replying, expressed the gratification which their hospitality and kindness had afforded him, and referred with pride and satisfaction to the great honour which had been conferred upon him in the presentation of his portrait to University College. In conclusion, he invited any of his old pupils, present and absent, when in the neighbourhood of Hindhead to call and see him in his "nest."

Mr. Norman Lockyer, F.R.S., proposed "University College and its President," and Mr. J. Eric Erichsen, F.R.S., the President, replied.

Prof. W. H. Flower, F.R.S., submitted "The Professors of University College." Prof. Henry Morley responded for the Arts Faculty, and Prof. G. C. Foster for that of Science.

Prof. Ramsay, F.R.S., proposed "The Chairman," and Sir Henry Roscoe, M.P., responded.

Prof. T. E. Thorpe, F.R.S., proposed "The Committee of the Williamson Testimonial," to which Mr. Michael Carteighe, President of the Pharmaceutical Society, and Dr. H. Forster Morley, the honorary secretaries, replied.

THE MORPHOLOGY OF BIRDS.[1]

II.

THE second part of vol. ii. is taxonomic and systematic. The author criticizes and tests the taxonomic value of the numerous characters of all the organic systems; each paragraph forms therefore a condensed *résumé* of our present knowledge of the various organs, with especial reference to those parts which proved to be of more than ordinary taxonomic importance. The question if an organ is of taxonomic value at all does not depend upon the presence or absence of the organ itself, but upon what it is like. Hence the weakness of those systems which have been based upon positive and negative characters only; even Garrod failed, since he took for his guidance not quality, but merely quantity. Those organic characters are preferable which exhibit a certain amount of differentiation, but which at the same time do not vary much within the limits of smaller groups of birds. Through combination of a considerable number of such characters, to be taken from organs between which there can be but little correlation, we have the best chance of arriving at a sound system. But of such characters there are, unfortunately, few.

However, on pp. 1580-91, Fuerbringer has selected forty-eight characters, not all, of course, of equal value, and has arranged them in tabular form, together with the ninety families into which he divides the birds. Especial attention may be drawn to the second column, which contains the first known occurrence of fossil members of each of the families. This column, together with the remarks on pp. 1107-10, and the discussions under the heading of each family in the special systematic part of the book, contains the only complete and critical essay on fossil birds that has yet been published.

But it is impossible to give here anything besides occasional hints about the vast amount of thought which the author has bestowed upon nearly all the organic systems, always on the look out for characters which might perhaps prove constant enough to act as guides amongst the chaos of the natural affinities of birds, always awake where great adaptiveness or convergence of forms might easily lead us astray.

Bill and feet proved to be of comparatively little value, in spite of their historical significance; the same applies to the oil-gland; whilst pterylosis is never to be neglected, especially that of the embryo.

Oology.—The size of the eggs depends upon the terrestrial, aquatic, or aërial life of the birds. Those which make their nests in high trees lay, as a rule, smaller eggs, and are "altrices"; whilst those which lay the eggs on the ground, and are "precoces," have more and larger eggs. Thickness of the shell, or the weight of the egg, often depends upon the smaller or greater liability of the eggs to external injury. The colour of the eggs stands, like that of the female bird, in correlation with the configuration of the nest, and affords good characters for classification. The best character, however, is formed by the finer structure or texture of the shell, since this remains unchanged in the species, and can also successfully be used for the recognition of wider relationship.

Skeletal System.—The importance of relative measurements has induced the author to look for a unit applicable to all birds. This he finds ingeniously in the average length of the dorsal vertebræ, because of the constancy of these parts. The numerous tables, which contain (pp. 794-800) an enormous number of measurements, have shown, however, that their taxonomic value is but very limited. The total number of vertebræ is inconstant even in the individual, and varies in larger groups to such an extent (Limicolæ 43-50, Anseres 50-63) that it can hardly be used in determining the systematic position of a given bird. Better results are yielded by the numbers of the cervical, thoracic, and sacral vertebræ alone, and their proportionate quantity, cf. Table xxii. pp. 778-79.

In the configuration of the sternum, the anterior margin, with its spine, is the most noteworthy point.

Of greater value is the configuration of the maxillo-palatine apparatus, as was first pointed out by Nitzsch, J. Mueller, and especially by Cornay in 1847. Huxley's classification, based upon these characters, in 1867, marked an epoch in the systematics of birds; but it is artificial, not natural, as the numerous exceptions and intermediate stages show, which have been discovered by later anatomists. The basipterygoid processes likewise afford gradual differences only. The whole maxillo-palatine apparatus is far too adaptive to permit of its use as a safe guide in classification.

The hyoid bones afford a rather good generic, and occasionally even a family character.

The size of the coraco-scapular angle depends in inversed ratio upon the development of the shoulder-muscles. This, with the various dimensions of the scapula, the processes and foramina of the coracoid, &c., receive special attention in the tabular lists, pp. 738-57,

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[1] "Untersuchungen zur Morphologie und Systematik der Voegel. zugleich ein Beitrag zur Anatomie der Stuetz- und Bewegungsorgane." Von Max Fuerbringer, Professor der Anatomie, und Direktor des anatomischen Institutes und des Museum Vrolik der Universitaet zu Amsterdam. Mit 30 Tafeln. (Amsterdam: T. van Holkema, 1888.) Continued from p. 152.